REMARKS

Status of the Claims

Claims 1, 3–4 and 7–8 were previously pending in this Application. Claims 1 and 7–8 have been amended herein. Claim 1 now recites "manganese (Mn) in an amount of from 0.2 to 0.7% by mass." Support for this amendment can be found in the Specification at pages 10–11 in paragraph [0023]. Claim 7 has been amended to recite "a molten alloy having a liquidus temperature or more." Support for this amendment can be found in the Specification at page 6 in paragraph [0015]. Claim 8 has been amended to correct punctuation. Applicants submit that no new matter has been added and respectfully request reconsideration of the Application in view of these amendments and the following remarks.

Claim Rejections – 35 U.S.C. § 103

Claims 1, 3–4 and 7–8 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Regazzoni et al., U.S. Patent No. 4,997,662, or Faure et al., U.S. Patent No. 5,073,207, and also over JP 09–271919 in view of Regazzoni et al. Applicants respectfully submit that the pending claims are patentably distinct from the cited references, taken either alone or in combination.

Regazzoni et al.

Regazzoni et al. ("Regazzoni") disclose high mechanical strength magnesium-based alloys formed by rapid solidification with a composition by weight of:

aluminum (Al):	2 – 11%
zinc (Zn):	0 – 12%
manganese (Mn):	0 – 0.6%
calcium (Ca):	0 – 7%

See Regazzoni et al., col. 1, ll. 7–17. The Regazzoni alloys always contain Al, at least one of Zn and/or Ca and optionally Mn. See Regazzoni et al., col. 1, ll. 10–14. The Regazzoni invention is wholly directed to achieving improved stress, strain and corrosion resistant properties by adding Ca to known commercial alloys identified in the specification by ASTM commercial

designations AZ31, AZ61, AZ80, AZ91 and AZ92. See Regazzoni et al., col. 2, ll. 58–65. Regazonni describes these standard compositions as "starting materials" containing Al (2–11%), Zn (0.2–3%) and Mn (0.1–0.6%) and explains that "the addition of calcium . . . makes it possible to improve the characteristics of the magnesium-based alloys, in particular those containing Al and/or Zn and/or Mn . . . ." See Regazzoni et al., col. 2, l. 58–col. 3, l. 16; col. 3, ll. 44–46. The Regazzoni disclosure further teaches a process for obtaining these alloys and claims both the magnesium-based alloys described above as well as the stated process. See Regazzoni et al., col. 10, l. 23–col. 12, l. 21.

Clearly, there is no teaching in Regazzoni to achieve a magnesium-based alloy with improved heat-resistance and castability. Regazzoni teaches improved mechanical strength via rapid solidification. Moreover, even if Regazzoni aimed to improve such properties, there is no teaching or suggestion therein that would motivate one of ordinary skill in the art to seek the exact composition claimed in Applicants' amended claim 1, particularly having an Mn range of 0.2 to 0.7% by mass.

While the Office Action dated November 2, 2006 states that it would have been obvious to one of ordinary skill in the art to select any portion of range from the broader range disclosed in Regazzoni, "it is [also] essential that . . . some motivation or suggestion to make the claimed invention in light of the prior art teachings" be found. See MPEP § 2144.08. Importantly, "the fact that a claimed species or subgenus is encompassed by a prior art genus is not sufficient by itself to establish a prima facie case of obviousness. See MPEP § 2144.08. "Some motivation to select the claimed species or subgenus must be taught be taught by the prior art." See MPEP § 2144.08 (emphasis added).

In this case, Applicants' claimed composition, particularly 0.2–0.7% by mass of Mn, is critical to achieving high heat-resistance and castability. There results were unexpected and not simply the product of routine investigation. Applicants have discovered through learned experimentation that the amount of Mn added to a magnesium alloy and the amount of Mn which

remains in such alloy have a proportional relationship until the added amount of Mn is approximately 0.5% by mass. For instance, when Mn is added in an amount over 1.0% by mass, the amount of Mn in the magnesium alloy does not effectively increase. Furthermore, Applicants have discovered that once the magnesium alloy contains approximately 0.5% by mass of Mn, any additional Mn simply aggregates into an Al–Mn crystallized compound and becomes a starting point for crack or fracture during casting. Moreover, when Mn in an amount of over 0.5% by mass is contained in the magnesium alloy, creep characteristics of the alloy are not significantly improved. Thus, Applicants have discovered that an amount of Mn around 0.5% in a magnesium alloy, more generally in a range of from 0.2 and 0.7% as recited in amended claim 1, provides a magnesium alloy with unexpectedly improved heat-resistance and castability. Clearly, this range is not simply the product of routine investigation by one of ordinary skill in the art but is rather the result of experimentation by Applicants and is critical to achieving the effective heat-resistance and castability sought by Applicants in the present invention.

A prima facie case of obviousness cannot be made absent a motivation or suggestion in the prior art that would lead a skilled artisan to select the subgenus of 0.2 – 0.7% by mass of Mn. Regazzoni fails to establish a prima facie case of obviousness for several reasons. First, Regazzoni is not aimed at improving heat-resistance and castability and teaches an entirely different process of rapid solidification for obtaining magnesium-based alloys. The question under 35 U.S.C. § 103 is not whether the differences between the claimed invention and the prior art would have obvious but whether the claimed invention ***as a whole*** would have been obvious. See MPEP § 2144.08. Although the Office Action indicates that the entire range disclosed in Regazzoni et al. has a suitable utility, the scope and focus of Regazzoni, in actuality, would not motivate a skilled artisan to manipulate the amount of Mn to achieve so as to achieve the alloy of amended claim 1.

Second, the claimed range of 0.2 to 0.7% by mass of Mn is critical to providing improved heat-resistance and castability. Regazzoni does not teach or suggest the manipulation of the disclosed broad ranges to achieve such a result nor that such range is critical to achieving

improved heat-resistance and castability. In fact, Regazzoni teaches away from such experimentation with the Mn range by merely describing "standard" compositions to which varying amounts of Ca added. See Regazzoni et al., col. 3, ll. 44–46.

Faure et al.

The invention of Faure et al. is directed to a simplified, economic process for obtaining commercially available magnesium-based alloys, "e.g., of the type AZ91 according to the ASTM standard," which exhibit improved mechanical characteristics. See Faure et al., col. 1, ll. 14–26. Faure et al. describe a process of spray deposition, to obtain an ingot having a composition by weight of:

Al	2 – 9%
Zn	0 – 4%
Mn	0 – 1%
Ca	0.5 – 5%
RE	0–4%

See Faure et al., col. 1, ll. 49–57. Like Regazzoni, Faure et al. is directed to processes for improving the mechanical properties of standard commercially-available compositions. See Faure et al., col. 1, ll. 15–17. The Faure et al. invention is not directed to obtaining an alloy with improved heat resistance and castability, nor does the disclosure teach or suggest to a skilled artisan the modification of the amount of Mn to achieve a range critical for improving heat resistance and castability.

JP 09-271919

The Office Action dated November 2, 2006 states that JP 09-271919 ("the '919 patent") discloses Applicants' claimed composition as well. See Office Action, 11/2/06, p. 4. Like Regazzoni and Faure et al., the '919 patent is directed to improving processes for obtaining a magnesium-based alloy. See '919 Patent, ¶ [0003]. In the '919 patent, the inventors disclose injection molding in a semi-molten as being an improvement over conventional die casting methods for forming automobile components. See '919 Patent, ¶¶ [0002]–[0003]. Not only does the '919 patent fail to teach or suggest that 0.2% to 0.7% by mass of Mn is critical to achieving a

magnesium-based alloy with improved heat resistance and castability but it also teaches away from Applicants' invention, as a whole, by specifically developing a process in place of casting.

In sum, none of the cited references wholly disclose Applicants' claimed subject matter and, accordingly, a prima facie case of obviousness has not been established. For at least these reasons, Applicants submit that amended independent claim 1 and claims 3–4 and 7–8 depending therefrom are patentably distinct from the cited references. Applicants respectfully request withdrawal of these grounds of rejection.

CONCLUSION

Based on the foregoing amendments and remarks, Applicants respectfully request reconsideration and withdrawal of the rejection of claims and allowance of this Application.

Respectfully submitted,
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